

REMARKS

By the present Amendment, claims 1-10 are cancelled and claims 11-28 are added. This leaves claims 11-28 pending in the application, with claims 11 and 20 being independent.

Substitute Specification

The specification is revised to avoid the objections raised in the Office Action and to eliminate grammatical and idiomatic errors in the originally presented specification. The number and nature of the changes made in the specification would render it difficult to consider the case and to arrange the papers for printing or copying. Thus, the substitute specification will facilitate processing of the application. The substitute specification includes no “new matter”. Pursuant to M.P.E.P. § 608.01(q), voluntarily filed, substitute specifications under these circumstances should normally be accepted. A marked-up copy of the original specification is appended hereto.

Rejections Under 35 U.S.C. §101 and §112, Second Paragraph

Original claim 9 stands rejected under 35 U.S.C. §101 as reciting a use without process steps and §112, second paragraph, as being indefinite. By the present Amendment, the originally filed claims are rewritten to avoid the language alleged to be insufficient or indefinite in the Office Action. All language of the presently pending claims is now believed to be adequate and definite.

Thus, the pending claims are definite and comply with 35 U.S.C. §101 and §112.

Rejection Under 35 U.S.C. §103

Claim 11 covers a valve comprising a valve housing 10 with first, second and third ports 1, 2, 3 extending through the valve housing and with a main piston 18 guided for movement

within the valve housing. A pilot control 26 with a pilot piston 24 is actuated by an electromagnet 28 to move to an open position where fluid flows from one of the first and second ports, actuated by the main piston, via a cross-sectional constriction orifice 38 in the main piston and via the control piston to the third fluid port actuated by the pilot piston. The main piston travels to a respective control position as a result of an accompanying pressure drop to actuate the first and second ports relative to amounts of fluid. The piston lift of the main piston with the pilot piston in the open position is proportional to currents supplied to the electromagnet. A compression spring 46 is between the main piston and the pilot piston and is received in a main piston recess 44 in the main piston. The cross-sectional constriction orifice discharges into the main piston recess. A contact piece 48 is on a free end of the compression spring adjacent the pilot piston, and is connected to a free end of the pilot piston by a contact ball.

By forming the valve in this manner, the valve can be produced at low cost while permitting high no-load lowering speeds with relatively few components in a reliable manner and allowing precise metering of the lowering speed while limiting leakage.

Claims 1, 2, 4-7 stand rejected under 35 U.S.C. §103 as being anticipated by U.S. Patent No. 5,072,752 to Kolchinsky. The Kolchinsky patent is cited for a proportional valve 20 having a housing 22, fluid ports 34, 38, 102, a main piston 40 and a pilot piston 76. A solenoid coil 122 allegedly actuates the pilot piston controlling the main piston via fluid pressure and compression spring 66. When the pilot valve 82 of the pilot piston is opened relative to seat 70, fluid allegedly flows through constriction 44 into pilot chamber 72 where it is drained via port 102. The resulting pressure drop allegedly causes the main piston actuate the two fluid ports 34, 38 relative to the amount of fluid pressure at port 38 (col. 5, line 55 – col. 6, line 13). Relative to

claim 4, selective valve 62 allegedly is housed within main piston 40 and has a cross-section constriction 56. Relative to claim 5, the solenoid allegedly has an armature 84, a coil 122 and a pole tube 124. The armature allegedly reciprocates in the pole tube when the solenoid is supplied with current with use of spring 66, 92. Relative to claims 6 and 7, pilot control 82 allegedly has a cylindrical gate 82 and a seat 100 or valve element by engaging seats of housing member portion 68.

Claim 3 stands rejected under 35 U.S.C. §103 as being unpatentable over the Kolchinsky patent in view of U.S. Patent No. 3,667,722 to Katz. The Kolchinsky patent is relied upon for a compression spring 66 engaging a recess of main piston 40 where a cross-sectional constriction 66 discharges fluid and where a free end of the compression spring engages a contact piece connected to pilot piston 76. The Katz patent is cited for an electromagnetic proportional valve where a compression string 72 engages a contact piece connected to a pilot valve by a contact ball 62. In support of the rejection, it is contended that it would be obvious to provide the Katz contact ball in the Kolchinsky valve.

Claim 8 stands rejected under 35 U.S.C. §103 as being unpatentable over the Kolchinsky in view of U.S. Patent No. 4,799,645 to Kramer. The Kramer patent is cited for a valve with seals (below 74) disposed on the outer surface of the pilot piston 60, 74. In support of the rejection, it is alleged that it would be obvious to use the Kramer seals on the Kolchinsky pilot piston.

Claim 9 stands rejected under 35 U.S.C. §103 as being unpatentable over the Kolchinsky patent in view of U.S. Patent No. 6,073,652 to Wilke. The Wilke patent is cited for a valve with

a pressure compensator 60. In support of the rejection, it is alleged that it would be obvious to use the Wilke pressure compensator 60 with the Kolchinsky valve.

Claim 11 is patentably distinguishable over the cited patents, particularly the Kolchinsky and the Katz patents, by a contact piece on the free end of the compression spring that is connected to a free end of the pilot piston by a contact ball. The Kolchinsky patent does not have this structure, as admitted in the Office Action. The Katz patent relied upon for teaching this function would not render this claimed subject matter obvious in combination with the Kolchinsky patent since modifying the Kolchinsky patent to include the Katz contact ball 62 would render the Kolchinsky patent inoperative by eliminating its valving action between pilot opening 74 and needle valve 82.

The Kolchinsky patent discloses a bidirectional cartridge valve having a poppet 40 with a counterbore 64 receiving a coil spring 66. A cylindrical pilot seat 68 fixedly mounted in housing 22 has an outer nose portion 70 that abuts the coil spring and an axial pilot opening 74 connecting valve chamber 36 with pilot chamber 72. The pilot opening 74 is normally closed by pilot valve 76, and is opened by the movement of needle valve 82. The opening and closing of pilot opening 74 by needle valve 82 is a significant part of the Kolchinsky valve operation.

The Katz patent discloses a proportional valve with a main valve member 18 that moves to open and closed positions relative to main valve seat 36 on stationary sleeve 23. This main valve member is not biased by a spring, particularly by spring 72. Spring 72 biases plunger 68 and ball 62 to close any opening between shoulder 66 and ball 62. As ball 62 and plunger 68 are moved to the open position by the operation of the pilot plunger 74, forming the pilot control of the Katz valve.

Using the Katz ball to connect Kolchinsky needle valve 82 to outer nose portion 70 of pilot seat 68 would appear to prevent that needle valve from opening and closing the opening 74 in nose portion 70, rendering the Kolchinsky valve inoperative for its intended purpose. Moreover, the Katz device involves a main valve member or piston 18 which is not biased by a spring connected between the main piston and a contact piece. As such, the Katz ball 62 is located in a position and arrangement which is not analogous to the valve structure of the Kolchinsky patent, particularly relative to the connection of needle valve 82 and opening 74 in outer nose portion 70 of pilot seat 68. In view of the different arrangements, it would not be obvious to use the Katz ball for connecting needle valve 82 and outer nose portion 70 of the Kolchinsky patent, as alleged in the Office Action.

Accordingly, claim 11 is patentably distinguishable over the cited patents considered individually or in any obvious combination thereof.

Claim 20 recites a valve system comprising a valve, as recited in claim 11, in combination with a pressure compensator coupled the valve to form an adjustable metering orifice of a flow regulator. Thus, claim 20 is patentably distinguishable over the Kolchinsky and Katz patents, for the same reasons advanced above relative to claim 11. Such reasons are not repeated to avoid burdening the record.

Claims 12-19 and claims 21-28, being dependent upon claims 11 and 20, respectively, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patents.

Claims 12 and 21 are further distinguishable by a selective valve in the main piston having a cross-sectional constriction in combination with the contact ball connecting the contact

piece in the pilot piston. Such combination is not disclosed or rendered obvious by the cited patents.

Claims 13 and 22 are further distinguishable by the electromagnet structure, within the overall claimed combination.

Claims 14 and 23 are further distinguishable by the compression spring biasing the pilot piston towards an open position, within the overall claimed combination.

Claims 15 and 24 are further distinguishable by the pilot piston being cylindrical on its free end. In contrast, the Kolchinsky pilot piston 82 is conical on its free end, not cylindrical.

Claims 16 and 25 are further distinguishable by the pilot piston interacting with a part of the valve housing. If the Kolchinsky nose portion 70 is interpreted as the connecting piece, it cannot also be a part of the housing forming the seat for the pilot piston, as required by the claim combination.

Claims 17 and 26 are further distinguishable by the additional sealing parts recited therein. Such are not adequately taught as to be rendered obvious in combination with the Kolchinsky, Katz and Kramer patents.

Claims 18 and 27 are further distinguishable by the contact ball being received in a contact recess in the contact piece, which recess only extends partially into and not through the contact piece. In contrast, the Kolchinsky device has and must have a through opening 74 in its nose portion 70.

Claims 19 and 28 are further distinguishable by the contact piece being movably mounted in the valve housing and biased against the pilot piston by the compression spring. No such movable and spring biased contact piece appears to be disclosed or rendered obvious by the

Kolchinsky and Katz patents since the Kolchinsky pilot seat 68 with its nose portion 70 appears to be a fixed portion of the housing and the Katz plunger 68 appears to be its pilot piston.

In view of the foregoing, claims 11-28 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



Mark S. Bicks
Reg. No. 28,770

Roylance, Abrams, Berdo & Goodman, LLP
1300 19th Street, NW, Suite 600
Washington, DC 20036
(202) 659-9076

Dated: August 31, 2009